NEOGENE-RECENT FAULTING IN THE TIMOR SEA – IMPLICATIONS FOR REGIONAL PROSPECTIVITY

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The Bonaparte Basin is a large sedimentary basin covering up to 270,000 km^2 of Australia's northwest shelf. It is a proven petroleum province, where most of the hydrocarbon accumulations are trapped by Mesozoic rift-induced faults. However, Neogene-Recent convergence of Australian plate with Banda Arc has resulted in flexure-induced extensional deformation in the northwestern Bonaparte Basin. Exploration history suggests that the recent breaching of the Mesozoic traps is one of the main causes for dry wells in the region. Thus, understanding the mechanisms and timing of fault reactivation is key for future exploration activities in the region. Analysis of basin-scale three-dimensional seismic data during this Ph.D. project has shown that the orientation of the Mesozoic fault trends strongly control the distribution and style of younger (Neogene-Recent) structures, forming complex linkages. Stratigraphic growth across the younger faults can be used to reconstruct the timing of fault activity. However, limited biostratigraphy data is available in the Neogene-Recent section. In this regard, we propose to use side-wall core (SWC) samples from two wells (Alaria-1 and Buffalo-1) intersecting syn-tectonic strata across the younger faults. The SWC samples will be used for detailed petrographic analysis (grain types, foraminifera identification, carbonate %), and Strontium (Sr) dating using isotope-ratio mass spectrometry. The Sr-isotope dating (combined with biostratigraphy data) will provide, for the first time, a robust timing of Neogene-Recent events in the north-western Bonaparte Basin. The timing will also provide new insights for reconstructing the recent tectonic evolution of the Timor Sea/Banda Arc region.

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